DOCUMENT RESUME

ED 476 432 HE 035 849

AUTHOR	Webb, Roger P.; Lee, Peter
TITLE	Evaluation of the Technology Workforce Development Grants Program. Report.
INSTITUTION	Texas State Higher Education Coordinating Board, Austin.
PUB DATE	2003-03-00
NOTE	12p.
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Grants; *Higher Education; *Labor Force Development; *Program Effectiveness; Program Evaluation; State Programs; *Technology
IDENTIFIERS	*Texas

ABSTRACT

The enabling legislation required a review of the Technology Workforce Development Grants program by an external expert evaluation team on a biennial basis. This program was designed to increase the number of engineering and computer science graduates and the number of collaborations among higher education institutions and private companies. At the time of this initial review, the first grants had been in place for less than a year. The external evaluation team used information from a number of sources, including site visits, to evaluate the beginning of the grants program. The evaluation concluded that the program is well-conceived and well-administered. Results achieved in the short life of the program indicate that it is progressing well. The funding that has been provided so far appears to have been used wisely and with good early impact. Recommendations are made for program continuance and improvement, with emphasis on the criteria and metrics used for further evaluations. An appendix lists the external review materials. (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 476 432

Evaluation

of the

Technology Workforce Development

Grants Program

A Report to the

Texas Higher Education Coordinating Board

Roger P. Webb, Ph.D.

Peter Lee, Ph.D.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

S.B. Rester

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent

March 2003

HE035849

BEST COPY AVAILABLE

2002 Technology Workforce Development Grants Program
Review Team

Dr. Roger P. Webb, Steve W. Chaddick School Chair and Georgia Power Distinguished Professor, School of Electrical and Computer Engineering, Georgia Institute of Technology.

Dr. Webb received a BS (electrical engineering) from the University of Utah in 1957, a MS (electrical engineering) from the University of Southern California in 1959, and a PhD (electrical engineering) from Georgia Tech in 1964.

He has been on the electrical and computer engineering faculty since 1964 where he has been active in teaching, research and program development. Dr. Webb has held the Georgia Power Company Distinguished Professorship since 1972. In this capacity, he has coordinated efforts in instructional and research program development in electric power engineering.

He served as School of Electrical and Computer Engineering's Associate Director from 1978 to 1989. Since 1990, he has served as the Director/Chair of the School of Electrical and Computer Engineering. He is the recipient of the 1983 Edison Electric Institute Power Engineering Educator Award. Dr. Webb is a Fellow of the IEEE (Institute of Electrical and Electronics Engineers, Inc.) and a registered professional engineer. He has worked in industry with Sperry Phoenix Company and with Douglas Aircraft Company and has served as a consultant to industry and government.

Dr. Webb is a former president of the National Electrical Engineering Department Heads Association (NEEDHA).

Dr. Peter Lee, Associate Dean for Undergraduate Programs and Professor, School of Computer Science, Carnegie Mellon University.

Dr. Lee received a PhD in computer and communication sciences from the University of Michigan in 1987. He has been on the School of Computer Science faculty since 1987 and the Associate Dean for Undergraduate Education since January 2000. He held visiting appointments at the École Normale Supérieure in Paris, France, in 1995 and 1997.

He currently is co-project leader of the Fox Project: Advanced Language Technology for Systems Software, the Staged Computation Research Project, and the Parallel Scientific Computing (PsciCo) Project.

Dr. Lee is President and Co-founder (1998) of Cedilla Systems Incorporated, a start-up company involved in the development of software products and services that exploit Proof-Carrying Code technology.

Evaluation of the Technology Workforce Development Grants Program

Program Review 2003
Austin, Texas
January 9, 2003

Roger P. Webb
Peter Lee

Background/Introduction

The 77th Texas Legislature passed the *Technology Workforce Development Act* (Senate Bill 353; Texas Education Code, Subchapter V, Technology Workforce Development, Sections 51.831-51.840) in 2001 and established the *Technology Workforce Development (TWD) grants program*. The two purposes of this act are to increase aggressively the number of engineering and computer science graduates in the state and to increase the number of collaborations involving higher education institutions, engineering and computer science departments, and private companies in Texas.

The act also laid the foundation for the *Texas Engineering and Technical Consortium (TETC)*, a non-profit organization of private industry and academic engineering and computer science departments. Under the law, the state matches industry and federal contributions made for the purposes of the Technology Workforce Development Act. The private industry/state government partnership is a unique feature of this program.

The enabling legislation requires the review of this program by an external expert evaluation team on a biennial basis, thereby prompting this early review. At the time of the review, the first grants had been in place for less than a year.

Review Procedure

The Texas Higher Education Coordinating Board staff provided the review team with an extensive package of background material prior to the site visit in Austin. During the visit, the team met with groups of project leaders, program administrators, and industry and government representatives. The visit started with a briefing by Coordinating Board staff on the administration of the program over breakfast. The team also met with Torrence Robinson, the Chair of the *TWD Grant Advisory Committee*.

During the morning, the team met first with representatives from the Lieutenant Governor's Office and the Legislative Budget Board and, separately, with a group of TETC executives from industry and universities. The team visited with project leaders from both electrical engineering and computer science departments in two separate meetings during late morning and early afternoon. Project leaders included both senior department and college leaders and research professors.

After a closed session in the late afternoon, the review team met with Coordinating Board staff for an exit interview. The team summarized for the staff its main findings and impressions in itemized and abbreviated form.

General Comments

The Texas Technology Workforce Development Grants Program is well-conceived, well-administered, and, based on results achieved in only a very short time period since its initiation, seems to be progressing nicely. The participating academic institutions endorse it, and the faculty project leaders are enthusiastically engaged and obviously committed to the goal of technology workforce development. The funding that has been provided to-date appears to have been used wisely and with strong early impact. This is a good program and the State of Texas should be commended for starting it.

Observations

- Peer tutoring is a common element of the overall strategy used by many of the projects. A study of the effectiveness of peer tutoring in improving the technology workforce, as well as a comparison of best practices, may yield useful insights.
- The University of Houston "red-shirt camp" appears to be an innovative and highly effective program. It appears that other institutions may want to start similar programs, if given funding and a way to learn from University of Houston's experience.
- The Infinity Project is having a major impact, both in freshman-level Computer Science and Electrical and Computer Engineering programs, as well as in K-12. Continuation of this program appears to be highly desirable.
- The enthusiastic response that project leaders have been receiving from high schools is surprisingly strong. This should be counted as an early success of the program, to be studied closely in future reviews.
- There are obvious major differences in the overall goals and qualities of the various educational institutions. This is a complexity that may have significant impact on the program in the future, and thus should be monitored closely.

There are mixed concerns about sustainability of the projects, given uncertainties about funding. Clear directive and commitment to future support is necessary to guarantee the success of this program, particularly since most of the programs require "follow-through" for students progressing through two-year or four-year educational programs. Despite current economic conditions that exacerbate the difficulties in obtaining adequate financial support from both industry and state resources, the fundamental goal of expansion of workforce resources in electrical and computer science seems to be obviously important to the Texas workforce and the state's economy.

Recommendations

A. Continuance

Given the population of Texas and the relatively large technology-based economic sector of the state, it is clear that expansion of the electrical engineering and computer science workforce is necessary from a maintenance viewpoint and mandatory from a growth viewpoint. Texas' current workforce development resources may not fulfill the needs of its large technology industry, and seem clearly to lag other states with large technology industries. The initiation of this program has been very positive and appears poised to have a major impact on technology workforce development.

- It is recommended that the program be continued at least at the initially proposed funding levels.

B. Criteria and Metrics

The criteria and metrics for progress and success are critically important. The "doubling" metric is valuable, but perhaps too coarse. The main goal is to enable clear benchmarking so that the program can measure its impact both within Texas (i.e., among participating and non-participating universities) and between Texas and other states.

Furthermore, issues of demographics and enrollment trends are factors in workforce expansion. It is recommended, therefore, that the program objectives be refined.

- Initiate an extensive benchmarking effort with regard to workforce development, technology-based economic sector, etc., with the view of defining program objectives which are realistic from a demographic point of view and which produce a clear strategic advantage for Texas. The Infinity Project, being such a large-scale collaboration, may provide an unusually valuable benchmarking opportunity.
- Develop a quantitative cost/benefit model for workforce expansion. Such a model will require extensive industry input. It is important that in the electrical engineering and computer science sector, analysis be based not only on the "high tech" industry but incorporate energy and process manufacturing industry elements, which also depend heavily on this workforce. Such analyses across other sectors could also be used as a decision element with regard to overall program expansion to incorporate other areas, i.e., civil engineering.

Industry Participation

Industry support and participation are clearly critical. It is important that the support be broad based and incorporate direct operational support as well as foundation support.

- Encompass all industry sectors that depend critically on electrical engineering and computer science resources (electronics, computers, telecommunications, energy, process controls, etc.), not only the high-technology sector.
- Consider developing a "tiered" participation model with levels of support correlated with program control, advisory boards, steering committees, etc. In general, the short-term goals for increasing industry participation should tend more towards increasing the

number of participating companies, as opposed to focusing mainly on the size of the financial contributions by the companies.

- Consider incorporating an in-kind contribution associated with industry internship program operational costs.
- Ensure that program marketing to industry is not solely based in existing university industry development organizations. The TETC can work to ensure a comprehensive marketing effort.

Program Operation

The goal of increased communications and cooperation between participating universities is very desirable and is being achieved to a surprising degree. Clearly, there are innovative projects under development and best practices being implemented in common elements such as the Infinity Project.

- Organize "best practice" meetings for project leaders. The project leaders were anxious to meet each other and "share notes." This strong desire is an opportunity that should not be wasted. Additional funding to support regular on-site meetings may yield many benefits in creating greater idea generation, benchmarking opportunities, etc.
- Project solicitations should require that processes for project assessment and achieving self-sustainability be included in the proposal, and that these process definitions be elements of proposal evaluation.
- Give consideration to developing mechanisms to enhance proposals and motivate project leaders to submit proposals to federal funding agencies for workforce development projects.
- Develop metrics and processes to ensure tight coupling between program expansion, the faculty, and facility infrastructure necessary to support the expansion and quality of the workforce elements being produced.

Appendix A

External Review Materials

Material provided for review included:

- Program Review Schedule

- Background on TWD Grants Program
  - Overview of Organizations and Committees
  - Texas Workforce Development Grants Program Advisory Committee Roster
  - Senate Bill 353: Technology Workforce Development
  - Coordinating Board Rules: Technology Workforce Development Grant Program
  - Coordinating Board Rules: Rules Change Regarding Proposal Evaluation
  - TETC By-Laws Version June 2002
  - 2002 Texas Technology Workforce Development Grants Program Announcement

- Information on Industry Fund Raising
  - Fund Raising Chart, *"TETC Fund Raising Successes 2002/2003"*
  - Industry Contribution Pie Diagram
  - TETC's Contribution Schedule (table)
  - Technology Workforce Development Grant Program Ledger (table)
  - Expected Lapse of State Money Due to Under-funding by Industry (table)
  - TETC's Goals and Fundraising Strategies

- Materials Regarding the TWD Grants Review
  - Grant Review Panel Members
  - Instructions for Reviewers
  - Memorandum: Normalization of Scores
  - Proposal Evaluation Form
  - Post-Review Evaluation Survey

- Competition Outcome
  - List of Eligible Institutions
  - Governor Rick Perry's Press Release, April 1, 2002
  - List of Funded Institutions
  - List of Funded Awards with Budgets
  - List of Proposals Not Funded
  - Sample Award Letter
  - Inclusion of Fringe Benefits (memo)
  - Amended Technology Workforce Development Grant Conditions (June 5, 2002)
  - TWD Grant Program Summaries and Progress (HTML version on CD media)
  - Technology Workforce Development Grant Program Annual Report 2002

- Measuring Progress
  - Electrical Engineering and Computer Science Student Rosters (memo)
  - Roster Comparison – Fall 2001 and Fall 2002 (table)

- Internships
  - Motorola's Offer of Internships as Pilot Program
  - E-mail Confirmation of Start of Internship Pilot Program
  - Flyer Announcing Internships
  - List of Participating Schools
  - Internship Application
  - Internship Application Evaluation Form
  - Internship Review Panel Members
  - Ten Students Selected by Review Panel (memo)
  - TETC Summer Internship Program 2002 – Summary Information
  - Top Five Winners with Internships at Motorola: Short Biographies
  - Draft for Second Internship Pilot Program: "All Across Texas"

Appendix B

Schedule

Technology Workforce Development Grants Program Review

January 9, 2003

Review Team: *Dr. Peter Lee*, Professor and Associate Dean for Undergraduate Programs, School of Computer Science, Carnegie Mellon University

Dr. Roger P. Webb, Steve W. Chaddick School Chair and Georgia Power Distinguished Professor, School of Electrical and Computer Engineering, Georgia Institute of Technology

Schedule:

All meetings, except breakfast, are at the Coordinating Board's headquarters, Bluebonnet Room, at 1200 E. Anderson Lane, Austin, Texas 78752.

Breakfast is at the Doubletree Hotel, 6505 N. IH35, near the Coordinating Board's offices. Lunch is at a restaurant of the team's choice.

7:30 a.m. Team meets for breakfast with Deborah L. Greene, Assistant Commissioner of Finance, Campus Planning and Research; Torrence Robinson, Chair of the Technology Workforce Development Grants Program Advisory Committee; Linda Domelsmith, Director of Research; and Reinold Cornelius, Program Director of Research.

The group will go over the day's schedule and discuss the workforce development program.

8:30 a.m. Discussion with representatives of the Lieutenant Governor's Office and the Legislative Budget Board. (Deborah L. Greene, Linda Domelsmith, Reinold Cornelius, and Torrence Robinson attend.)

The purpose of this session is to give the team an overview of the objectives of the program from the perspective of state representatives.

State Government Officials

Debbie Baisden
Legislative Budget Board

Joe Dyer
Lieutenant Governor's Office

Cheryl Vanek
Lieutenant Governor's Office

9:15 a.m. Briefing and discussion of the administration of the programs and program outcomes with the Technology Workforce Development (TWD) Grants Advisory Committee. (Linda Domelsmith and Reinold Cornelius attend.)

The staff will present an overview of how the program is operated and some outcomes of the program. TWD Advisory representatives will explain academic concerns and program guidelines.

Members of the TWD Grants Advisory Committee

Torrence Robinson, Chair Texas Instruments	Bill Carroll UT Arlington
Sam Hughes Motorola	Ben Streetman The University of Texas at Austin

10:15 a.m. Discussion with industry representatives of the Texas Engineering and Technical Consortium (TETC).

TETC representatives will explain industry needs and objectives. Program staff does not attend this session.

Members of the Texas Engineering and Technical Consortium

Tegwin Pulley, Chair Texas Instruments	Gray Mayes Texas Instruments
Allyson Peerman Advanced Micro Devices	Janis Carter Winstead Sechrest & Minick P.C.
John Halton, Executive Director TETC, UT Austin	Mary Beth Maddox, Exec. Manager TETC, UT Austin

11:15 a.m. Meet with project leaders from eight computer science departments of small and large institutions.

This group will give the team a perspective on the administration of the program and its general impact on computer science and higher education in Texas. Program staff does not attend this session.

Computer Science Project Leaders

John Werth The University of Texas at Austin	Dr. J. Carter Tiernan UT Arlington
Dr. Alfredo Perez-Davila University of Houston Clear Lake	Dr. Moonis Ali Southwest Texas State University
Denise Martinez Tarleton State University	

12:15 p.m. Lunch. The committee may wish to dine as a small group to discuss their observations. Program staff does not attend.

1:45 p.m. Meet with project leaders from six electrical engineering departments of small and large institutions.

This group will give the team a perspective on the administration of the program and its general impact on electrical engineering and higher education in Texas. Program staff does not attend this session.

Electrical Engineering Project Leaders

Raymond R. Shoults
UT Arlington

William Dillon
UT Arlington

Jonathan W. Bredow
UT Arlington

E. Douglas Harris
UT Dallas

Fritz Claydon
University of Houston

John O. Attia
Prairie View A&M University

Lars K. Hansen
UT San Antonio

3:00 p.m. Break

3:15 p.m. Meet in closed session to discuss conclusions and prepare first draft of final report.

This time can also be used to follow up on any questions to THECB staff.

4:15 p.m. Exit interview with Assistant Commissioner. (Deborah L. Greene, Linda Domelsmith, and Reinold Cornelius attend.)

5:00 p.m. Depart

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").